

Controlled Release of Curcumin from a Thermoresponsive Polypeptide Hydrogel for Anti-Tumor Therapy

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Abstract : Polypeptide thermosensitive hydrogel is an excellent candidate as a smart device to deliver drugs and cells due to its remarkable biocompatibility, low gelation concentration, and respond to temperature stimuli, it can be easily injected as a polymer solution into the patient's body where it undergoes gelation due to an elevation in temperature. Poly (ethylene glycol) monomethyl ether-poly (ethyl-l-glutamate) (mPEG-PELG) contains a hydrophobic side chain -C₂H₅ which is useful in encapsulating and stabilizing hydrophobic drugs. In this study, we plan to focus on the hydrophobic anti-carcinogenic and anti-inflammatory drug curcumin, which due its insolubility in water, requires a proper carrier for delivery into the body. Our main concept is to use mPEG-PELG to stabilize curcumin, inject the curcumin-loaded hydrogel into the tumor site, and allow the enzymatically-sensitive hydrogel to be degraded by bodily fluids and release the drug. The polymers of interest have been successfully synthesized and characterized by ¹H-NMR, FT-IR, SEM, and CMC. Curcumin loading content and drug release were assayed using HPLC. Preliminary results show that these materials have potential as a delivery vehicle for poorly soluble drugs.

Keywords : curcumin, drug release, hydrogel, polypeptide material

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